

Fact sheet about sensory properties of organic yoghurt

- **recommendations for processing**
- **recommendations for product development**
- **recommendations for marketing**

Deliverable 6.3

FiBL Switzerland



Consumers' sensory preferences for organic natural yoghurt



France

French organic consumers prefer natural yoghurt with a non-fluidifying texture.

Germany

German organic consumers prefer stirred natural yoghurt with a smooth and sticky appearance, sticky mouthfeel, fresh taste and without liquid on the surface.

Italy

Italian organic consumers prefer creamy, firm and dense natural yoghurt with a fatty mouthfeel and little liquid on the surface.

Netherlands

Dutch organic consumers prefer stirred natural yoghurt.

Poland

Polish organic consumers prefer natural yoghurt with a creamy appearance, creamy and firm texture, fresh taste, and sticky and dense mouthfeel.

Switzerland

Swiss organic consumers prefer stirred natural yoghurt with a creamy and smooth appearance and creamy texture. They favour yoghurt without liquid on the surface. Furthermore, natural yoghurt with moderate sourness and dense mouthfeel is preferred.

Sensory properties of organic yoghurt

The main purpose of the ECROPOLIS project was to provide and exchange sensory information on organic food to the industry (organic associations, producers, processors, retailers, wholesalers) as well as to the public at large: the consumers. Not only sensory profiles comparing organic and conventional food products were developed. Besides, the impact of regulations for organic food production on sensory properties of organic food and the labelling effect on consumers' sensory preferences were investigated. The consequences of the results can now be used for improvements in product development and processing, as well as for sensory marketing of organically produced food.

1 Impact of EU organic regulations and private standards on sensory characteristics

1.1 Regulatory impact on sensory properties of organic natural yoghurt tested

There is no impact through the EU regulation for organic production on sensory properties of natural yoghurt. In contrast, potential influences of private standards are found: The prohibition of non-milk based thickeners for the production of natural yoghurt through the standards of Bio Suisse (Swiss umbrella organisation) has an impact on the texture and appearance of natural yoghurt. The international Demeter standards prohibit homogenisation by means of a homogeniser. This prohibition has an impact on texture and appearance of natural yoghurt. Furthermore, the Demeter Switzerland standards do not allow the addition of milk powder or milk protein, which also has an impact on yoghurt's texture and appearance. Regarding Bioland standards, no regulatory impacts on sensory attributes of natural yoghurt are found.

1.2 Summarising impact matrix about regulatory impact on sensory properties of organic yoghurt

The regulatory impact through EU regulations and Swiss governmental regulations for organic food production (EU/CH), as well as through private organic standards (Bio Suisse, Demeter (national and international) and Bioland) on sensory properties of natural yoghurt is shown in the following table.

Table 1: Impact on sensory properties of natural yoghurt through regulatory requirements

Relevant standard issues for sensory properties	Relevant restriction or general allowance	Swiss governmental regulation	Private organic standards	Impact on sensory properties				Regulatory impact			
				Taste	Odour	Texture	Appearance	EU/CH	Bio Suisse	Demeter	Bioland
Ingredient of agricultural origin	Milk with different fat contents	A	A	X	-	X	X	-	-	-	-
	Milk powder addition	A	Bio Suisse: A Demeter international: A Demeter CH: not allowed	(x)	-	X	-	-	-	(x)	-
	Milk protein addition	A	Bio Suisse: A Demeter international: A Demeter CH: not allowed	(x)	-	X	-	-	-	(x)	-
Additives	Non-milk based thickeners	A with some restrictions	Bio Suisse: not allowed Demeter: no Alginates	-	-	X	X	-	(x)	-	-
Processing aids	Starter cultures (yoghurt bacteria)	A	A	XX	X	-	-	-	-	-	-
Processing methods	Change of fat content through centrifugation or cream addition	A	A	X	-	X	X	-	-	-	-
	Pasteurisation	A	A	X	-	X	-	-	-	-	-
	Homogenisation	A	Bio Suisse: max. 250 bar Demeter: only by a centrifuge	-	-	(x)	(x)	-	-	(x)	-
	Stirring	A	A	-	-	XX	XX	-	-	-	-

A: allowed; -: no impact; (x): probable impact; X: relevant impact; XX: high impact

Besides natural yoghurt, strawberry yoghurt was tested in Switzerland. Hence, Table 2 additionally illustrates the regulatory impact on sensory properties of fruit yoghurt.

Table 2: Impact on sensory properties of fruit yoghurt through regulatory requirements

Relevant standard issues for sensory properties	Relevant restriction or general allowance	Swiss governmental regulation	Private organic standards	Impact on sensory properties				Regulatory impact		
				Taste	Odour	Texture	Appearance	CH	Bio Suisse	Demeter
Ingredients of agricultural origin	Fruits	A	A	X	-	-	X	-	-	-
	Sweetening ingredients	A	A	X	-	-	-	-	-	-
	Milk powder/protein addition	A	BioSuisse: A Demeter CH: not allowed	(x)	-	X	-	-	-	(x)
	Colouring ingredients	A	Bio Suisse, Demeter CH: not allowed		-	-	XX	-	XX	XX
	Flavouring ingredients	A if derived from natural substances	Bio Suisse, Demeter CH: not allowed	XX	X	-	-	(x)	XX	XX
Additives	Non-milk based thickeners	A with some restrictions	BioSuisse: not allowed in yoghurt; rice starch, tapioca starch allowed for fruit compound Demeter CH: no Alginates	-	-	X	X	-	(X)	-
Processing aids	Starter cultures (yoghurt bacteria)	A	A	XX	X	-	-	-	-	-
Processing method	Homogenisation	A	BioSuisse: max. 250 bar Demeter: only by a centrifuge	-	-	(x)	(x)	-	(x)	(x)

A: allowed; -: no impact; (x): probable impact; X: relevant impact; XX: high impact

2 Factors that influence the sensory characteristics of natural yoghurt

The fat content, the yoghurt cultures, the addition of milk powder and milk protein, and the processing methods (homogenisation, stirring) have a major influence on sensory properties of natural yoghurt.

2.1 Taste

Fat content

The fat content has the most significant influence on taste of natural yoghurt. Fat is a flavour carrier so that a higher fat content leads to a more intense taste of natural yoghurt and a higher acceptance by consumers.

Starter cultures

The type of starter cultures used also have a strong influence on taste, mainly regarding sourness. Yoghurt is traditionally produced by the cultures *Streptococcus thermophiles* and *Lactobacillus bulgaricus*. The effect of yoghurt cultures on each other is mutually beneficial, i.e. they have a symbiotic relationship that leads to an increased acidity in the end product. Due to a demand for mild yoghurt, other microorganisms such as the mild cultures *Lactobacillus acidophilus* and *Bifidobacterium bifidum* are used. Among these cultures, the mutual effect is missing and the production of L (+) lactic acid is increased. Both factors lead to a lower acidity and a milder taste.

Milk powder/milk protein

By adding milk powder or milk protein, a higher amount of lactose is present in the milk that can be fermented to lactic acid, leading to higher acidity in natural yoghurt.

Shelf-life

The shelf-life has a slight influence on the sourness of natural yoghurt. The fermentation process is not completely stopped when the natural yoghurt is filled in the cups, but continues at a lower level in the cups. The earlier the 'best before' date, the longer the yoghurt was already stored and the higher the expected intensity of sourness.

2.2 Texture

The influencing attributes for texture are the fat content, the addition of milk powder and milk protein, additional thickeners, and the processing method homogenisation. The pasteurisation has an impact as well. There is also a sensory difference between stirred or semi-solid natural yoghurt.

2.3 Appearance

The appearance of natural yoghurt is influenced by the fat content, by homogenisation and whether or not the yoghurt is stirred or semi-solid.

2.4 Odour

Yoghurt cultures have an impact on the intensity of fermented, lactic and sour odour.

3 Country-specific attributes of liking and recommendations to improve consumers' acceptance of natural yoghurt

The country-specific attributes of liking and disliking are illustrated in the following.

France

Organic consumers in France have varying sensory preferences for natural yoghurt. However, to improve the overall acceptance of natural yoghurt, a fluidifying texture should be avoided.

Germany

Organic consumers in Germany overall prefer a smooth, sticky and creamy appearance of natural yoghurt. Furthermore, the overall acceptance of natural yoghurt is high if the product has a fresh, persistent and fermented taste, and a sticky, breaking and flowing texture. In contrast, the overall consumer acceptance is low for natural yoghurt with a firm appearance and with liquid on the surface. The same applies to a dense and fluidifying texture as well as a fermented odour.

Italy

Italian organic consumers' overall acceptance of natural yoghurt is high if the product has a fermented odour, a fatty, sticky, breaking and dense texture and a creamy, firm and sticky appearance. However, their acceptance of yoghurt with a fluidifying and mouth flowing texture and smooth appearance is low.

Netherlands

Organic consumers in the Netherlands prefer natural yoghurt with a homogenous and shiny appearance. In contrast, natural yoghurt should not have an intense and butter-like odour or liquid on the surface.

Poland

Organic consumers in Poland favour natural yoghurt with a lactic and sweet odour. The product should have a creamy, smooth and sticky appearance. Finally, a fresh taste increases consumers' acceptance, whereas a fermented, animal and bitter taste strongly decreases the liking of the product. The sensory attributes of liquid on the surface and with an animal-like odour as well as with a mouth flowing texture should also be avoided.

Switzerland

Among Swiss organic consumers, the acceptance of natural yoghurt with a sticky and dense texture, and a sticky, creamy, smooth and firm appearance is high. In contrast, liquid on the surface leads to decreased consumer acceptance.

4 Label effect

An effect of the organic label on consumers' liking of the product (label effect) was found in Germany, Italy and Poland, while the effect was weak or not found in France and the Netherlands. A strong positive label effect indicates a largely positive image of the product characteristic 'organic'. In such cases, it is promising to highlight the attribute 'organic' as a unique selling proposition when marketing the product. In cases of no or even negative label effects, product improvement is required.

France

In France, an organic label effect was found. One organic yoghurt brand achieved significantly higher scores when labelled with an organic logo in the branded test (with labelling) compared to the blind test (without labelling). However, another organic yoghurt brand labelled with an organic logo scored slightly lower among consumers.

Given that no clear label effect was identified among French organic consumers, highlighting 'organic' as a unique selling proposition is less promising. Instead, a product improvement or differentiation strategy should be favoured.

Germany

Germany was one of the countries where the label effect on the preference of natural yoghurt was high. A slight tendency towards a positive influence of organic labelling and a negative influence of conventional labelling was identified. In two cases this difference was significant: in one case, a label effect was found in an organic sample, which was well accepted by the consumers. In the second case, a label effect was found regarding a conventional product labelled as organic. The latter was already well accepted in the blind test, but with an organic label it scored significantly higher. Differences between heavy and light users in the branded test were not detectable. Only in the blind test, heavy users scored higher both for organic and for conventional yoghurt samples. But again, this difference was not significant.

The strong label effect among German organic consumers of organic food indicates the positive image of the attribute 'organic' in relation with natural yoghurt. Thus, highlighting 'organic' as a unique selling proposition is a promising marketing strategy.

Italy

In Italy, the impact of the organic label was low. Only one significant difference occurred in the branded test: the conventional yoghurt that was already least liked in the blind test scored even significantly lower with the conventional label. Differences between heavy and light users were small. By tendency, heavy users scored higher for organic yoghurts in the branded test, but not lower for conventional.

Given the low organic label effect, processors and providers of natural yoghurt can increase consumer acceptance of organic natural yoghurt by means of a product improvement strategy, rather than by highlighting 'organic' as a unique selling proposition.

Netherlands

The effect of organic labelling on overall liking was slightly positive, but not significant and not in all natural yoghurt samples tested within the project. A slight tendency that heavy users scored lower for organic products in the branded test was observed.

Given the low organic label effect, processors and providers of natural yoghurt could increase the consumer acceptance of organic natural yoghurt by means of a product improvement strategy based on the consumer preferences measured in this country rather than by highlighting 'organic' as a unique selling proposition.

Poland

The biggest differences between heavy and light users regarding overall liking can be observed in Poland. In the branded test, heavy users scored significantly higher for organic yoghurt than light users. The strong label effect among Polish organic heavy users indicates the positive image of the attribute 'organic' in relation with natural yoghurt. Thus, highlighting 'organic' as a unique selling proposition, is a promising marketing strategy. This strategy is particularly successful in shops that are frequented by organic heavy users. To reach a broad spectrum of consumers, product improvement strategies based on the consumer preferences in Poland are also promising.

Switzerland

Although the impact of labelling in Switzerland was low, a tendency of higher scores for organic products and lower scores for conventional by heavy users in the branded test was found. Lower scores by heavy users in the branded test for conventional products were found.

Given the low organic label effect, processors and providers of natural yoghurt can increase the consumer acceptance of organic natural yoghurt by means of a product differentiation strategy based on consumer preferences measured in this country.

5 Strategic options regarding product development and communication measures for organic yoghurt

Table 3 shows that different measures for product development and communication need to be taken, depending on which strategy a company is choosing. Country-specific issues as well as product related issues have to be kept in mind.

Table 3: Strategic options with regard to product development and communication

YOGHURT Strategic options	Imitation / standardisation strategy	Differentiation strategy (freshness, authenticity)	Country specific issues
Product development	<ul style="list-style-type: none"> Standardised fat content (ensure creamy character). 	<ul style="list-style-type: none"> Ensure freshness character through minimal processing (no double pasteurisation of milk). Fruit yoghurts without flavours and colouring additives/extracts: reduce colour and flavour deficits by requiring special tasty fruit varieties or by mixing different fruits. 	<ul style="list-style-type: none"> Different expectations regarding liquid on surface (e.g. IT yes, CH no). Creaminess: particular important in CH and PL.
Communication measures	<ul style="list-style-type: none"> Communicate: “we are as good as standard products, but we are also organic” in those countries, where organic labelling has a positive influence for yoghurts (DE, PL, FR). 	<ul style="list-style-type: none"> Communicate the paler colour of fruit yoghurts e.g. strawberry yoghurt as sign of naturalness and authenticity. Make consumer tasting in shops (to explain and experience differences). Offer training for sales staff. Communicate freshness character (in particular in DE and PL). 	<ul style="list-style-type: none"> Preference for organic yoghurts in DE, PL, IT. Preference for conventional yoghurts in FR. Low influence of organic labelling in CH and IT: use other attributes than organic.

The following checklist helps to identify improvement potential regarding product development and sensory marketing of organic natural yoghurt, as well as fruit yoghurt.

Check points	Yes	No	Don't know
Raw material:			
Are all ingredients organic? Refer to EU Reg. 834/2007			
Are non-organic ingredients listed in Annex VIII?			
Could non-organic ingredients be replaced by an organic ingredient?			

Additives:			
Are the additives listed in Annex VIII?			
If applicable: Are the additives listed in private organic standards?			
Could additives be avoided?			
Could additives be replaced by an ingredient?			
Could the additives of agricultural origin be replaced by an organic additive (e.g. soy lecithin could be replaced by organic soy lecithin)?			
Could prohibited additives (e.g. non-milk based thickeners) be replaced or other measures taken to improve the sensory quality?			
Processing aids:			
Are the processing methods allowed by the regulations and private organic standards (e.g. no GMO, homogenisation)?			
Are all processing steps really needed (e.g. double pasteurization)?			
Packaging:			
Is the packaging really needed for product protection (e.g. double packaging)?			
Is it possible to recycle the package?			
Is it possible to dispose it ecologically?			
Labelling:			
Are the minimal standards of the food law as well as of the organic regulations fulfilled?			
Could the declaration be extended for better consumer information (e.g. declaration of processing methods, origin of raw material, food miles)?			
Sensory Marketing:			
Could the prohibition of non-milk based thickeners (in case of private standards) and its consequences on yoghurt texture and appearance be used in marketing?			
Could the restriction on homogenisation (in case of private standards) and its consequences on yoghurt texture and appearance be used in marketing?			
Could the prohibition of flavouring and colouring ingredients (in case of private standards) and its consequences on taste and appearance of fruit yoghurt be used in marketing?			

6 Description of OSIS

OSIS offers information about sensory aspects of food and related issues. All relevant data gained from research in the ECROPOLIS project are made available to consumers, associations, producers and processors of the food sector. OSIS offers various levels of data access based on the needs of the target users and highlights the relevant specific information, e.g. in a “European-Sensory-Journey”, easy-reading fact sheets or detailed reports.

Imprint

Stolz, H., Espig, F., Kretzschmar, U. (2011): Fact sheets on all the tested products in the appropriate language. Deliverable No. 6.3 of ECROPOLIS Project. Research Institute of Organic Agriculture (FiBL), Frick, Switzerland.

© October 2011

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Acknowledgements

This report was produced with financial support from the Commission of the European Community under the 7th Framework Programme.

We would like to thank all project research partners that participated in this report as well as the experts of the SME association, which supported the work.

A special thank goes to Otto Schmid from FiBL Switzerland, Kirsten Buchecker from ttz-Bremerhaven, Tim Obermowe from University of Goettingen, Annette Bongartz and Marie-Louise Cezanne from ZHAW University of Applied Sciences in Wädenswil, as well as Ursula Kretzschmar from FiBL (coordinator of the project) for their supportive work and feedback.

Corresponding publications within the ECROPOLIS project

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Schmid, O. (2011): Report on the recommendations for a research agenda and strategic options for sensory quality communication for different target groups.

For further information please visit the project homepage at <http://www.ecropolis.eu>.